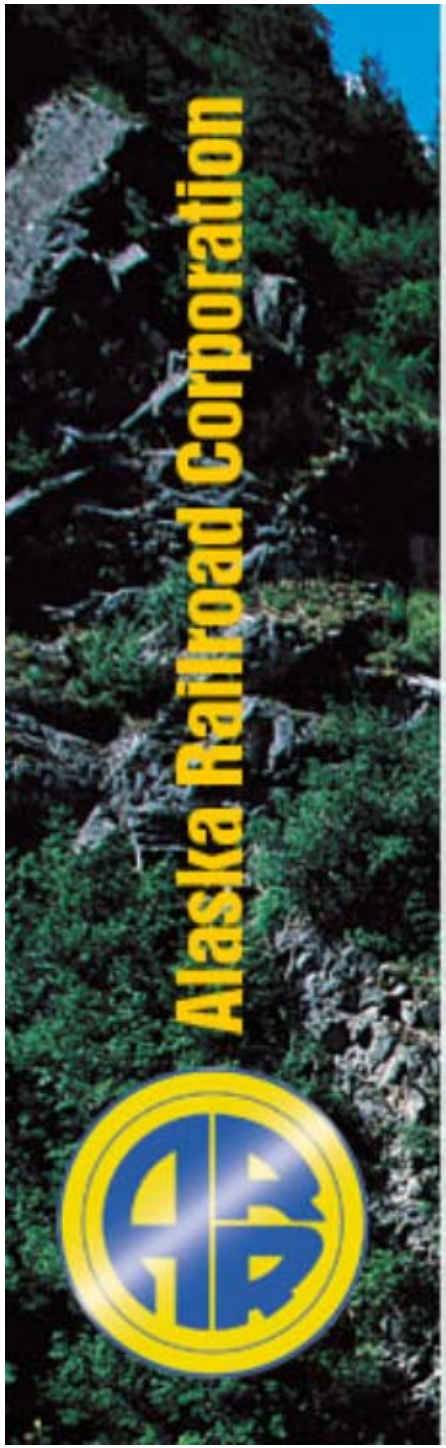
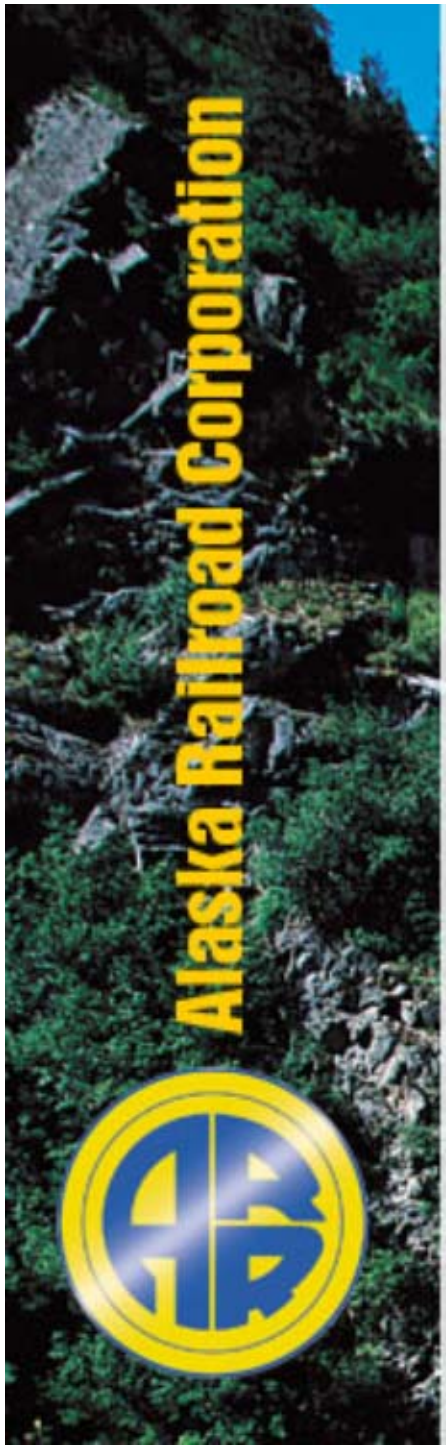

Alaska Railroad Corporation
Building a great railroad for the Great Land
October 2002



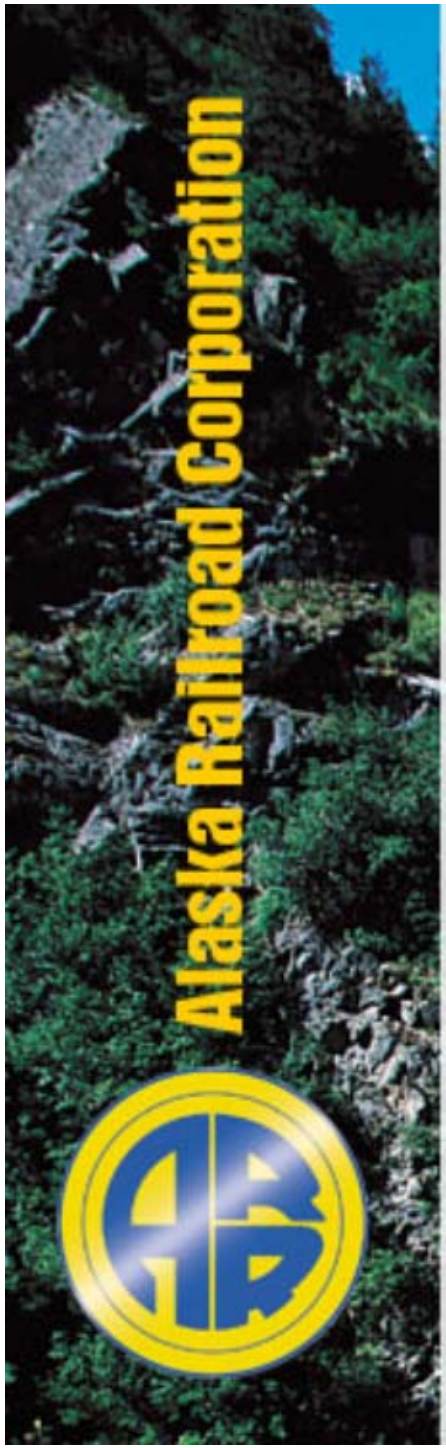
The Alaska Railroad

- A public corporation owned by the State of Alaska since January 1985
- Operations are self-supporting through earned revenues
- More than 650 full time, year-round employees
- 611 miles of track
- Revenue in 2001 - $107.3 million
- Net Income - $6.6 million
- More than $306 million in total assets
- Carried over 600,000 passengers in 2001



Our Mission

Our mission at the Alaska Railroad is to be profitable by focusing on safe, high quality service to our freight, passenger and real estate customers. To foster the development of Alaska's economy by integrating railroad and railbelt community development plans.

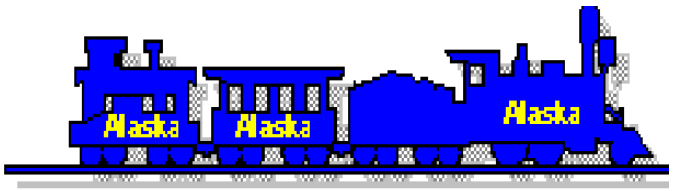


A Look Back ---

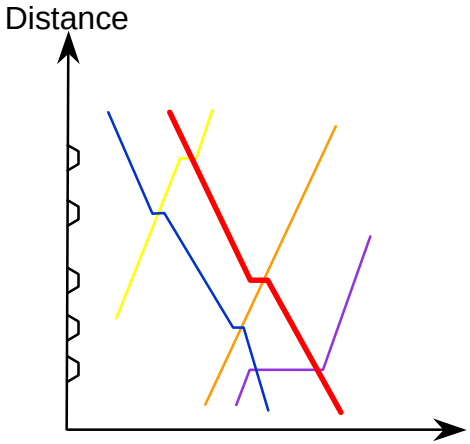
January 1997

Mission Statement

“The Alaska Railroad Corporation will undertake a project to provide an integrated track control and communications system which authorizes trains, equipment and people to occupy track, moving safely and efficiently.”



What About Positive Train Control?



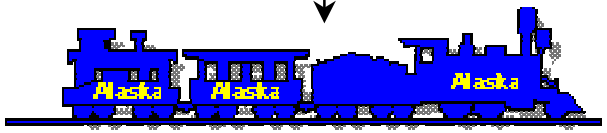
Movement Plan

Real Time Data for Dispatcher

Position Report

Trip Plan and Movement Authorities

Location Detection System

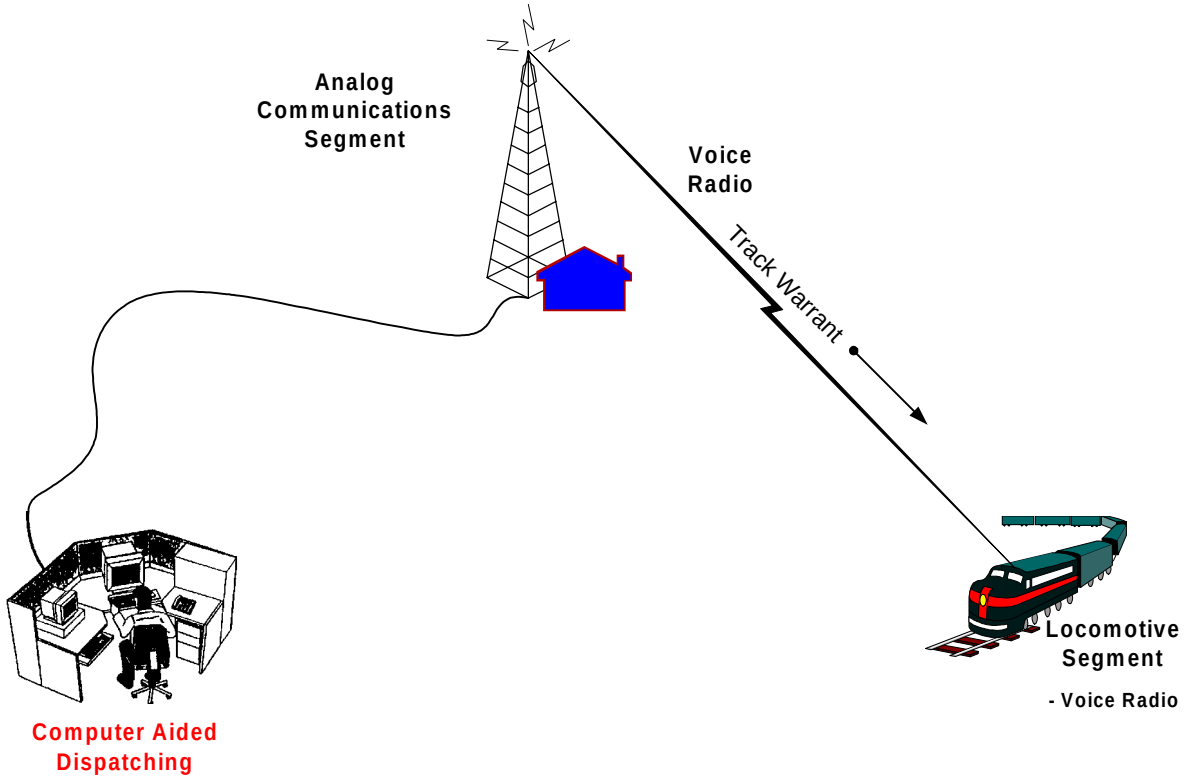


Planning with Real Time Checks **+** **Continuous Updating with Safety Overlay**

= Positive Train Control

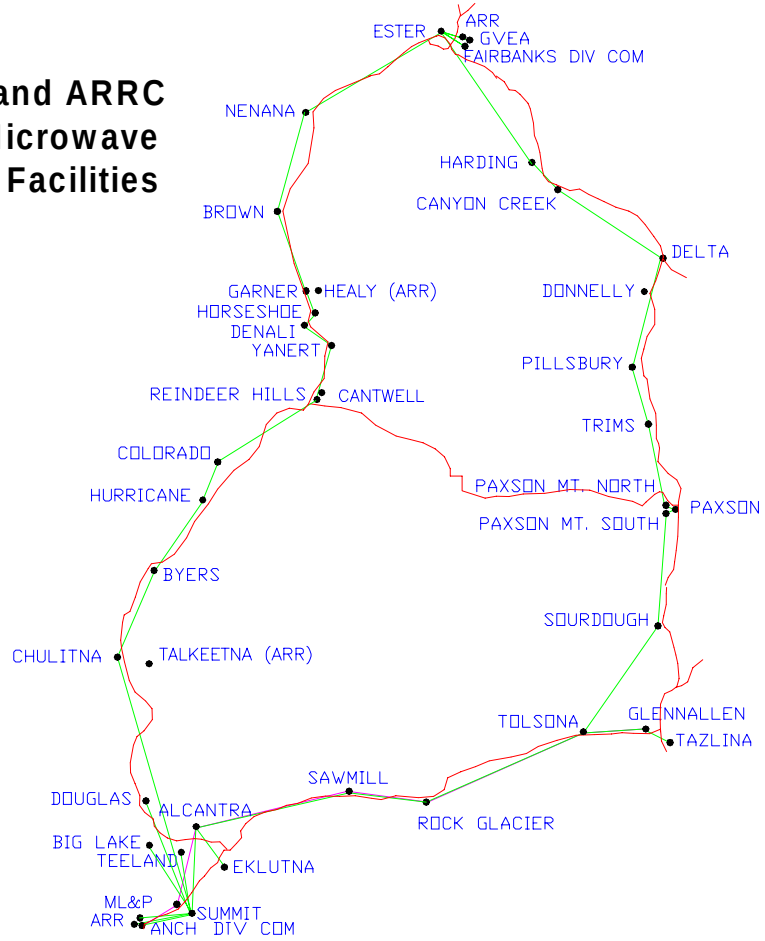
Creating the Best Plan and Safely Making It Happen

PTC - Phase 1


Analog
Communications
Segment
Voice
Radio
Track Warrant
Locomotive
Segment
- Voice Radio
Computer Aided
Dispatching

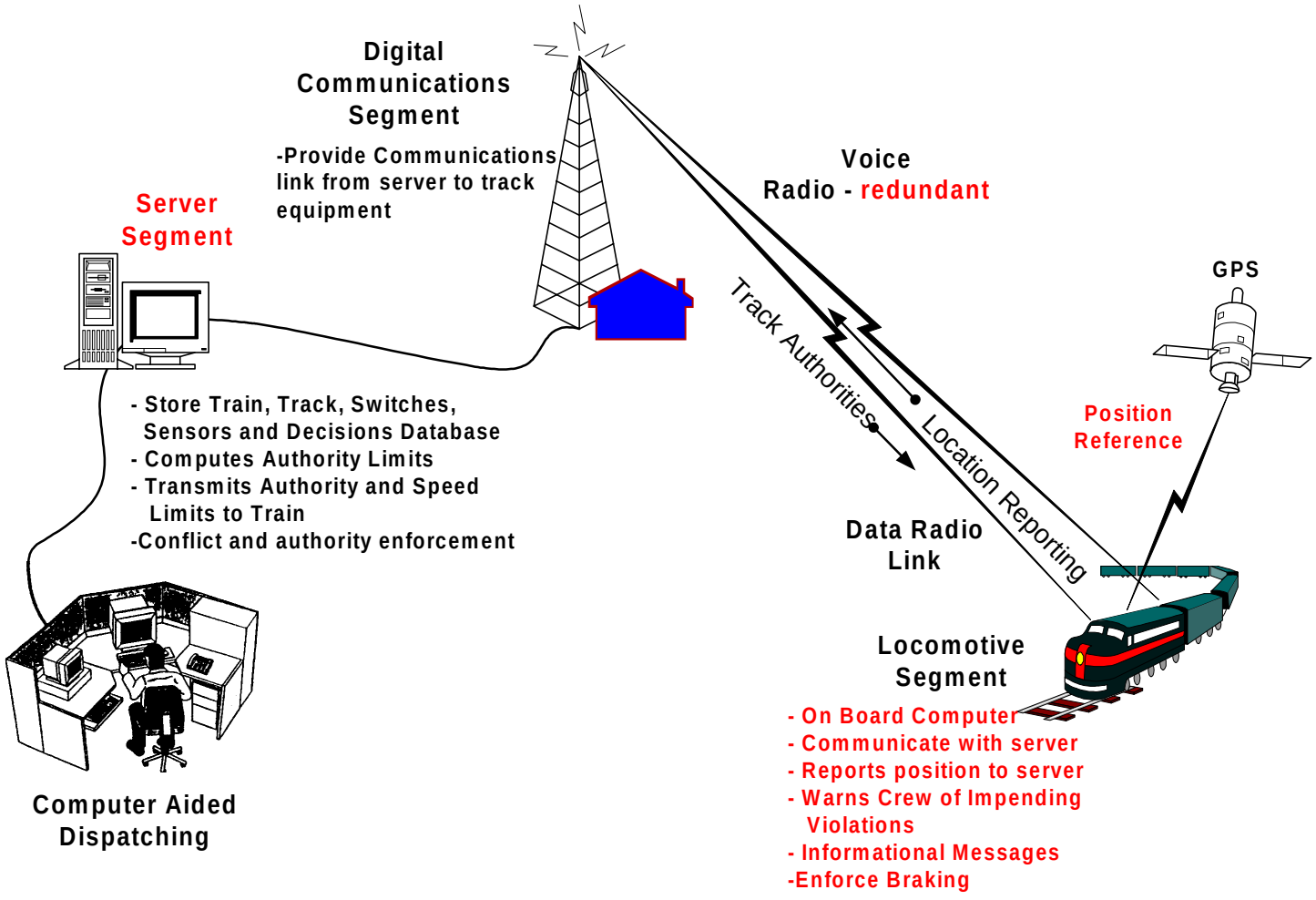
PTC - Phase 2

State of Alaska and ARRC
Analog/Digital Microwave
Communication Facilities

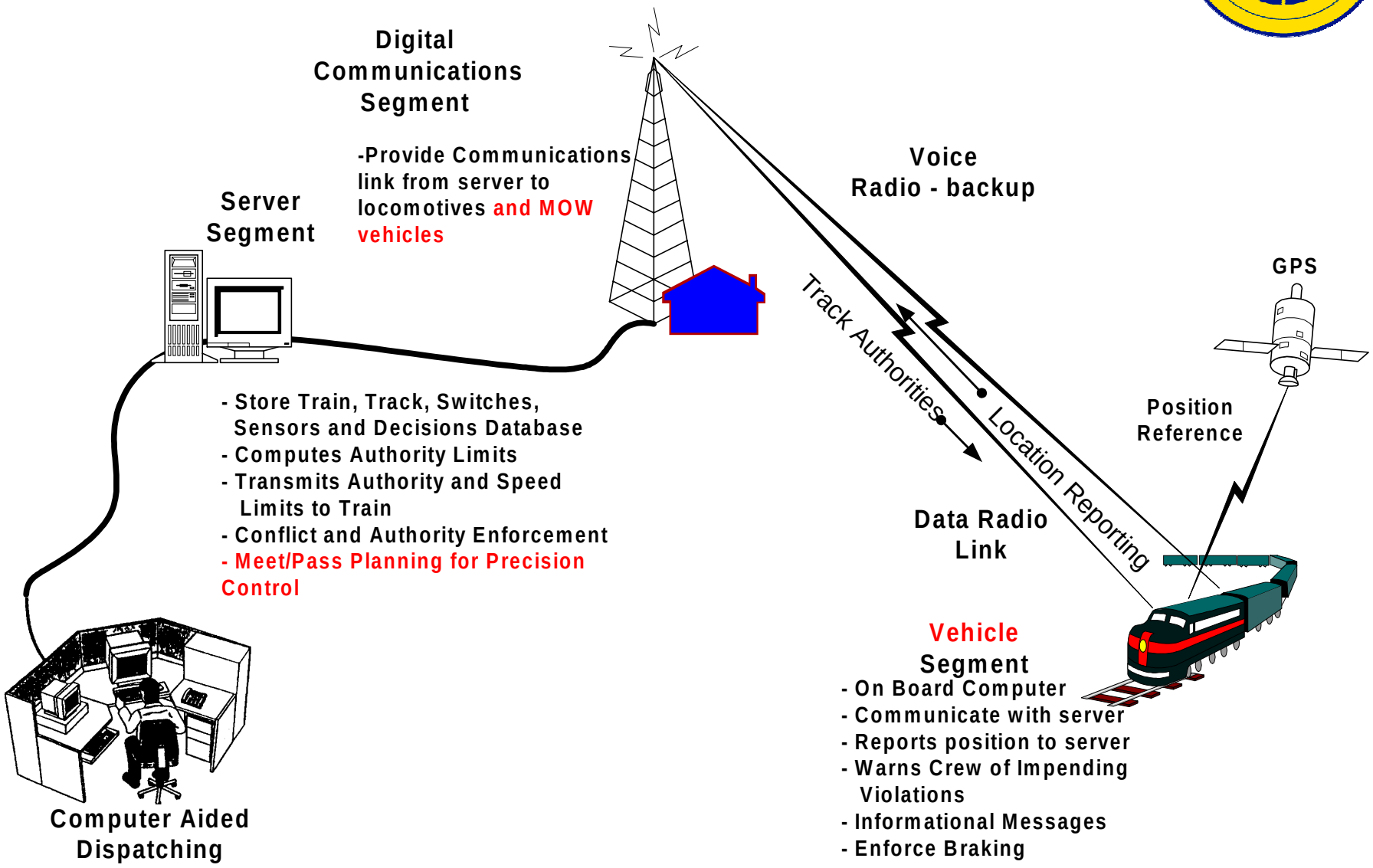


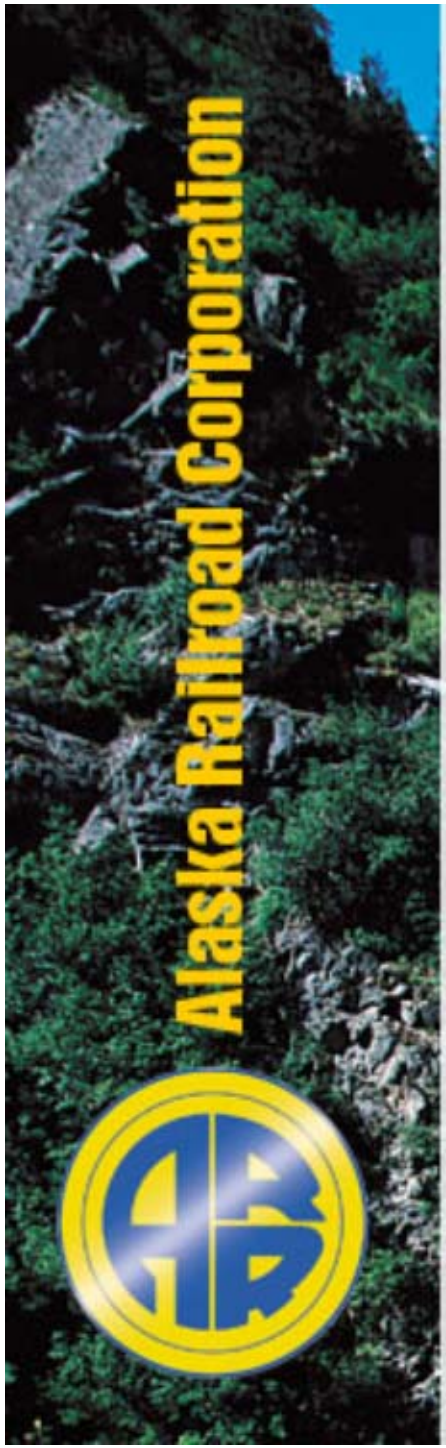
Alaska Road System
Microwave Communication Links
Site Names

PTC – Phase 3


Digital Communications Segment
-Provide Communications link from server to track equipment
Server Segment
Voice Radio - redundant
GPS
Track Authorities
Location Reporting
Position Reference
- Store Train, Track, Switches, Sensors and Decisions Database
- Computes Authority Limits
- Transmits Authority and Speed Limits to Train
-Conflict and authority enforcement
Data Radio Link
Locomotive Segment
- On Board Computer
- Communicate with server
- Reports position to server
- Warns Crew of Impending Violations
- Informational Messages
-Enforce Braking
Computer Aided Dispatching

PTC - Phase 4


Digital
Communications
Segment
-Provide Communications link from server to locomotives and MOW vehicles
Server
Segment
Voice
Radio - backup
GPS
Track Authorities
Location Reporting
Position
Reference
- Store Train, Track, Switches, Sensors and Decisions Database
- Computes Authority Limits
- Transmits Authority and Speed Limits to Train
- Conflict and Authority Enforcement
- Meet/Pass Planning for Precision Control
Data Radio
Link
Vehicle
Segment
- On Board Computer
- Communicate with server
- Reports position to server
- Warns Crew of Impending Violations
- Informational Messages
- Enforce Braking
Computer Aided
Dispatching



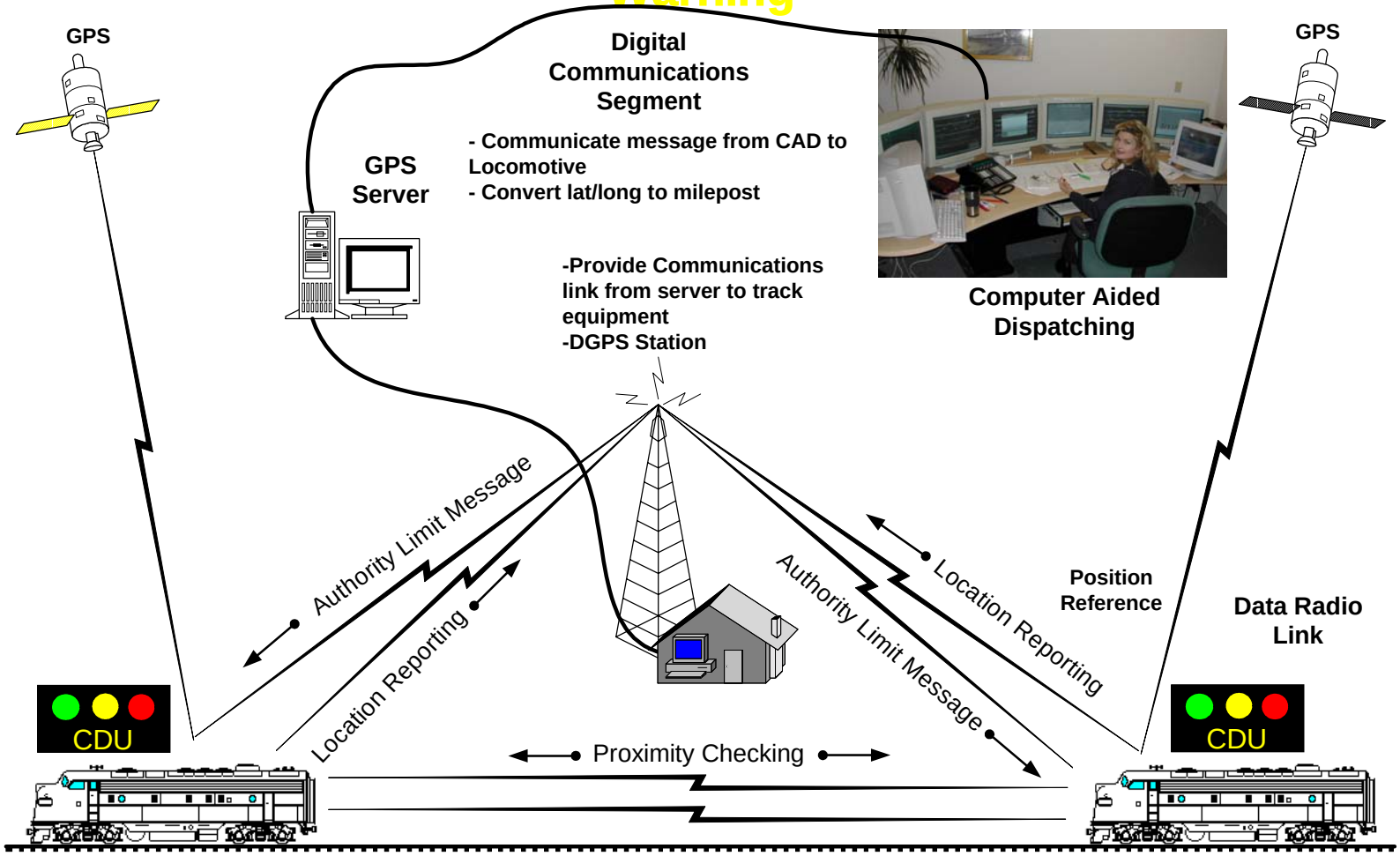
Lessons Learned

- **Communications Network**
  - Backbone redundancy
  - Coverage
  - Efficiency of protocol
- **Operations Efficiency not minimized**
- **Change Management**
- **Degraded system operations**
- **Railroad domain knowledge essential**

A Look Ahead
-
How do we proceed?

CAS Part II Step 1

Location Reporting/Authority Limit Warning/Proximity Warning



Locomotive Segment

- On Board CAS Display Unit
- Data Radio/GPS receiver Unit
- Communicates and reports position with server
- Warns Crew of Proximity of Other CAS Equipped Locomotives and Impending Authority LimitsViolations

CAD Trackline Display 1

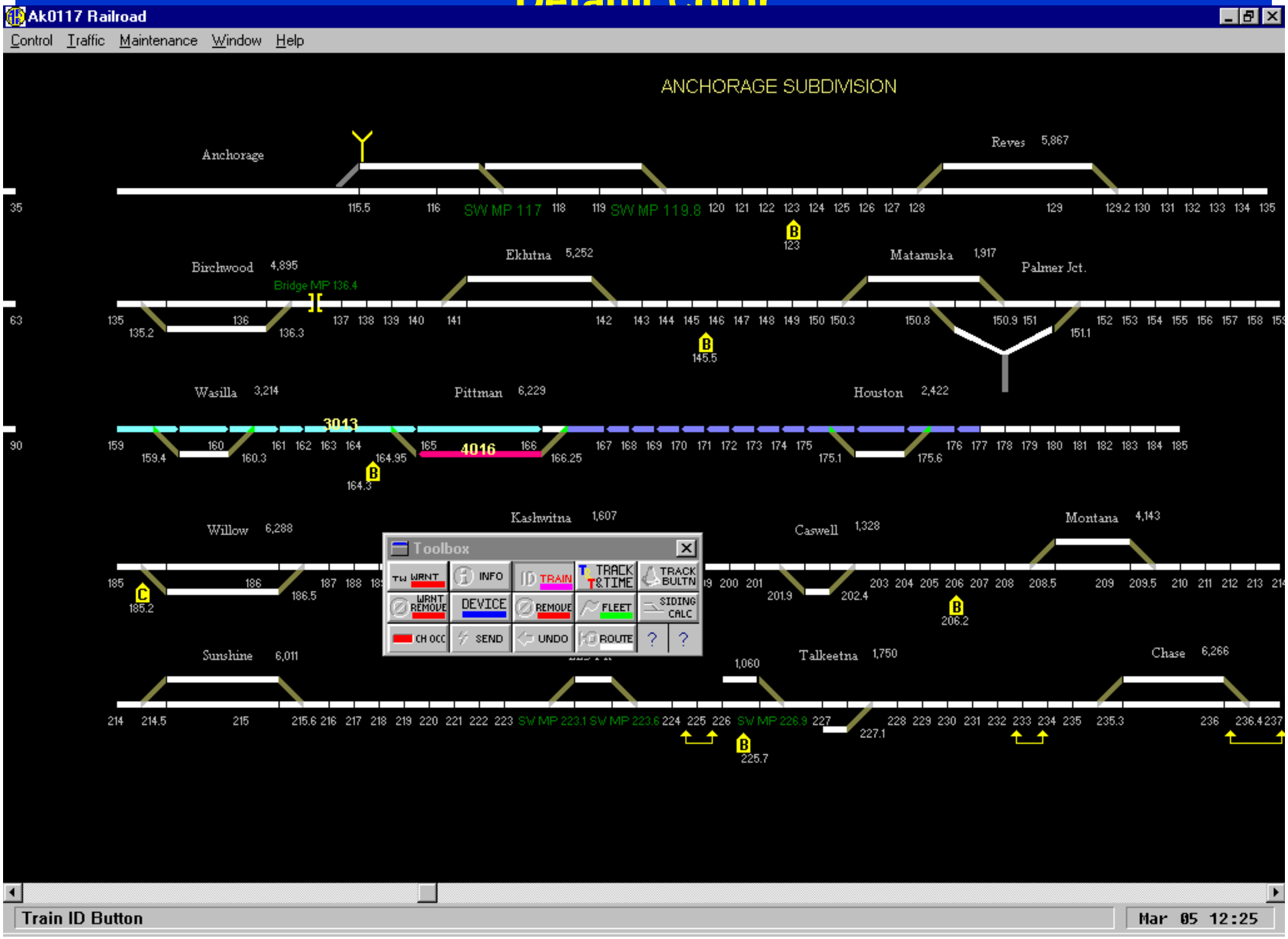
Equipment ID Moves Along Track Line in Real Time

CAD Trackline Display 2

Track Segments Indicate Occupancy in Red with ID Movement

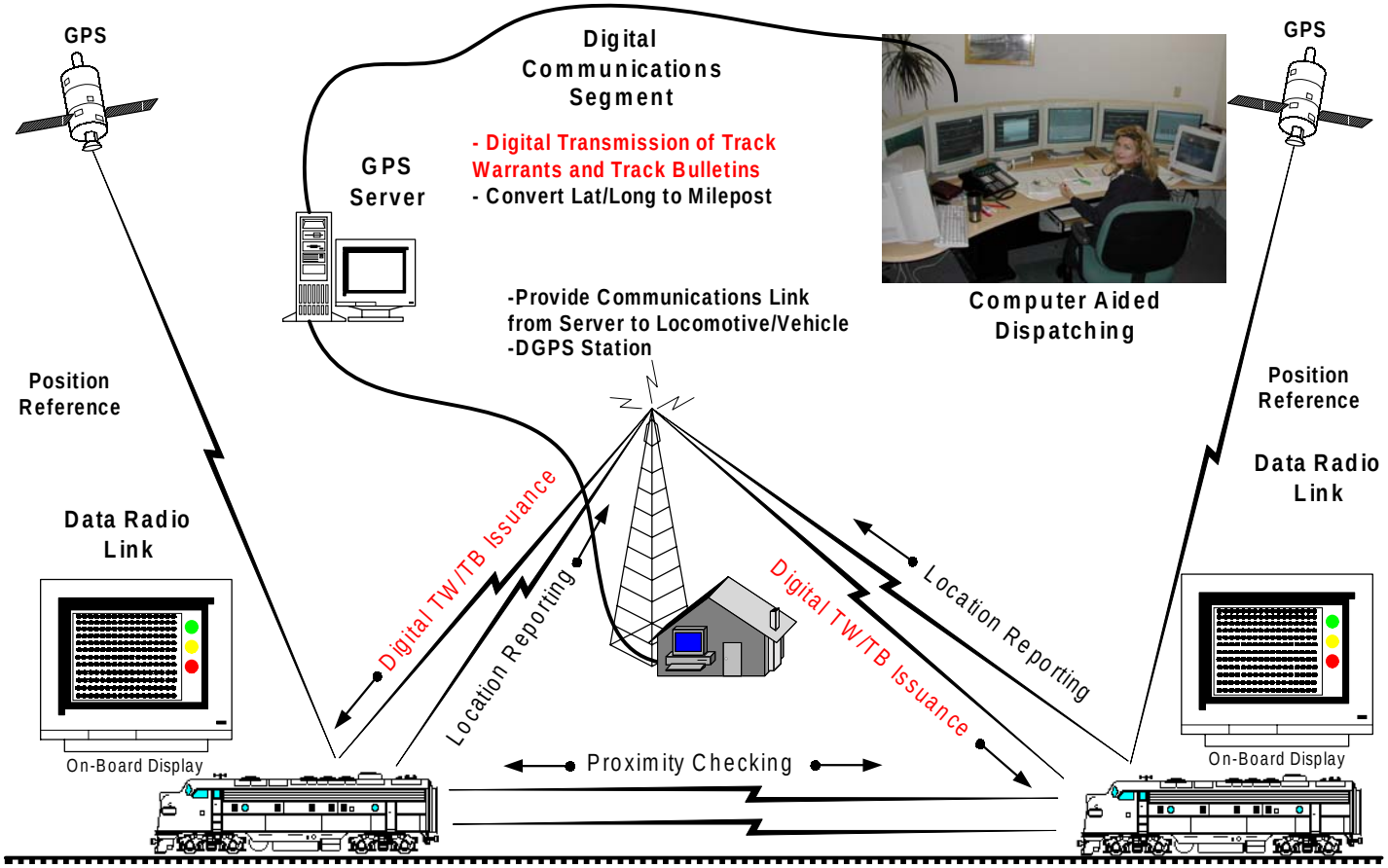
CAD Trackline Display 3

During Communication Outage, Track Indication Fades to Default Color



CAS Part II Step 2

Transmission of Track Authority/Restrictions to Locomotive On-Board Display including enforcement



Locomotive Segment

- On Board CAS Flat Panel On-Board Display
- Data Radio/GPS Receiver Unit
- Communicates and Reports Position with Server
- Warns Crew of Proximity of Other CAS Equipped Locomotives/Vehicles and Impending Authority Limits Violations

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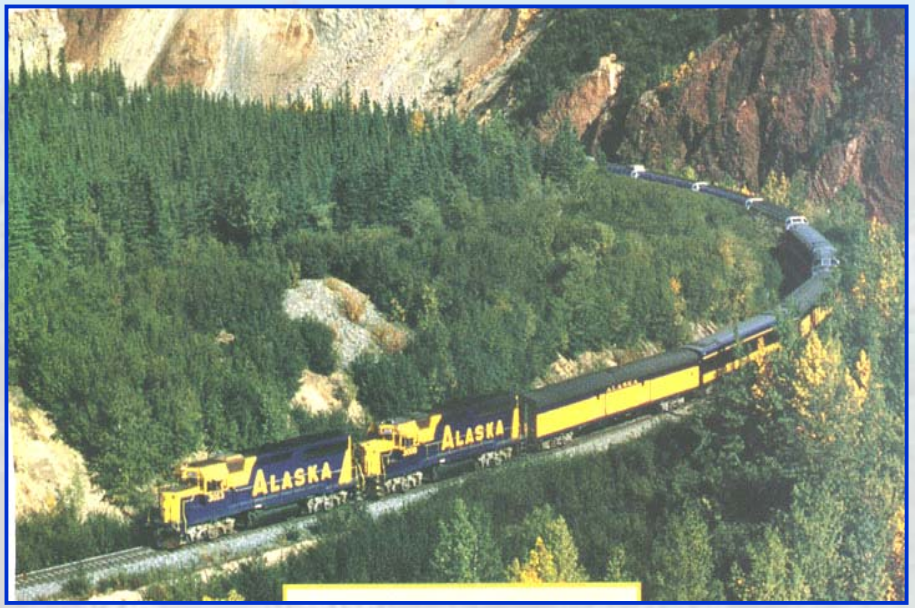
Various Types of Locomotives to Equip

- 4000 HP SD70 MAC locomotives
- GP38, GP40 and GP49
- MP12
- Rebuild four Rail Diesel Cars (RDC)
- Three FT40 Head End Power locomotives
- Acquisition of bi-directional equipment



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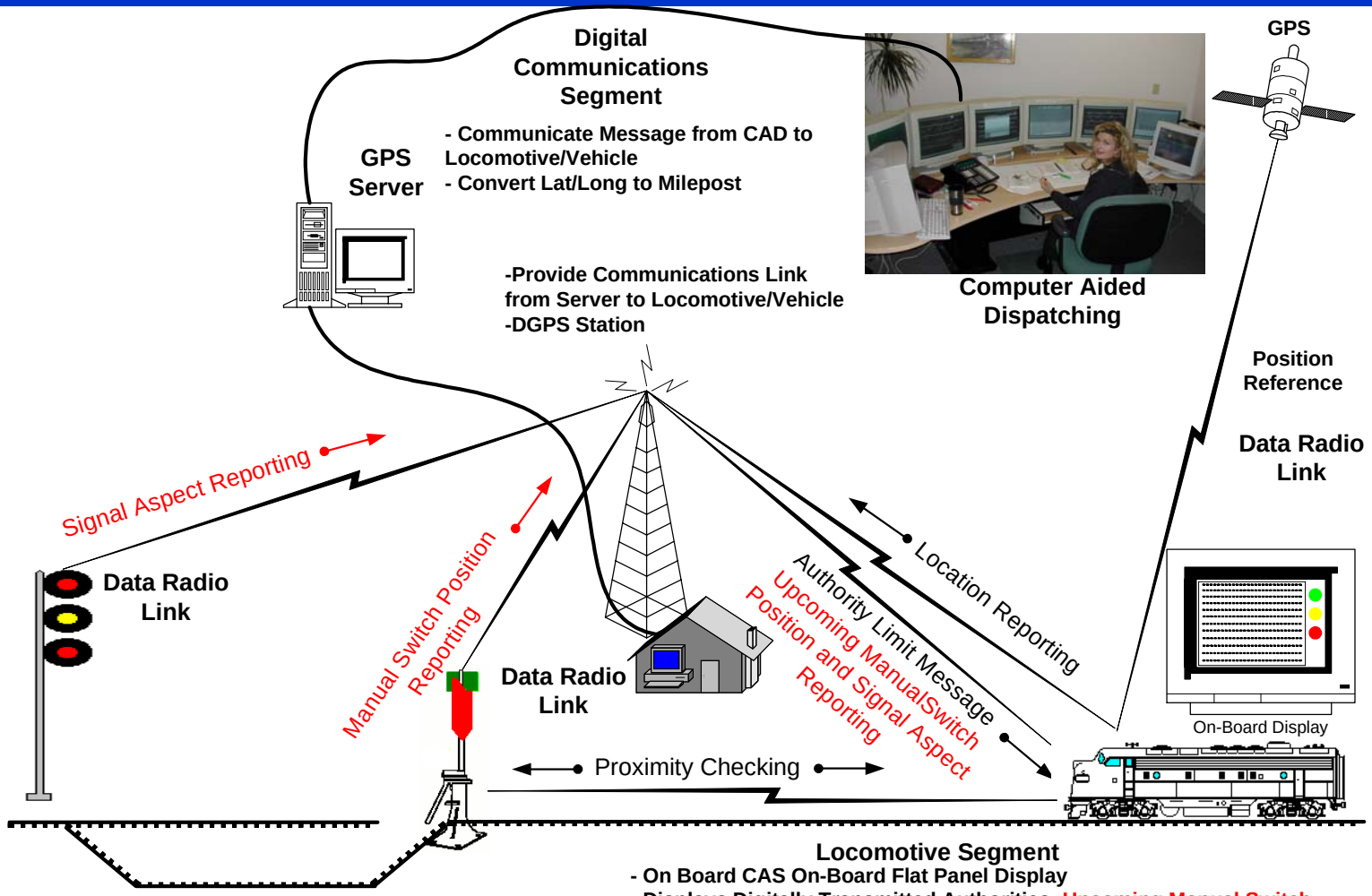
Improved Siding Access

Yesterday

Present
& Future

CAS Part II Step 2 Cont.

Manual Switch Position and Signal Aspect Reporting

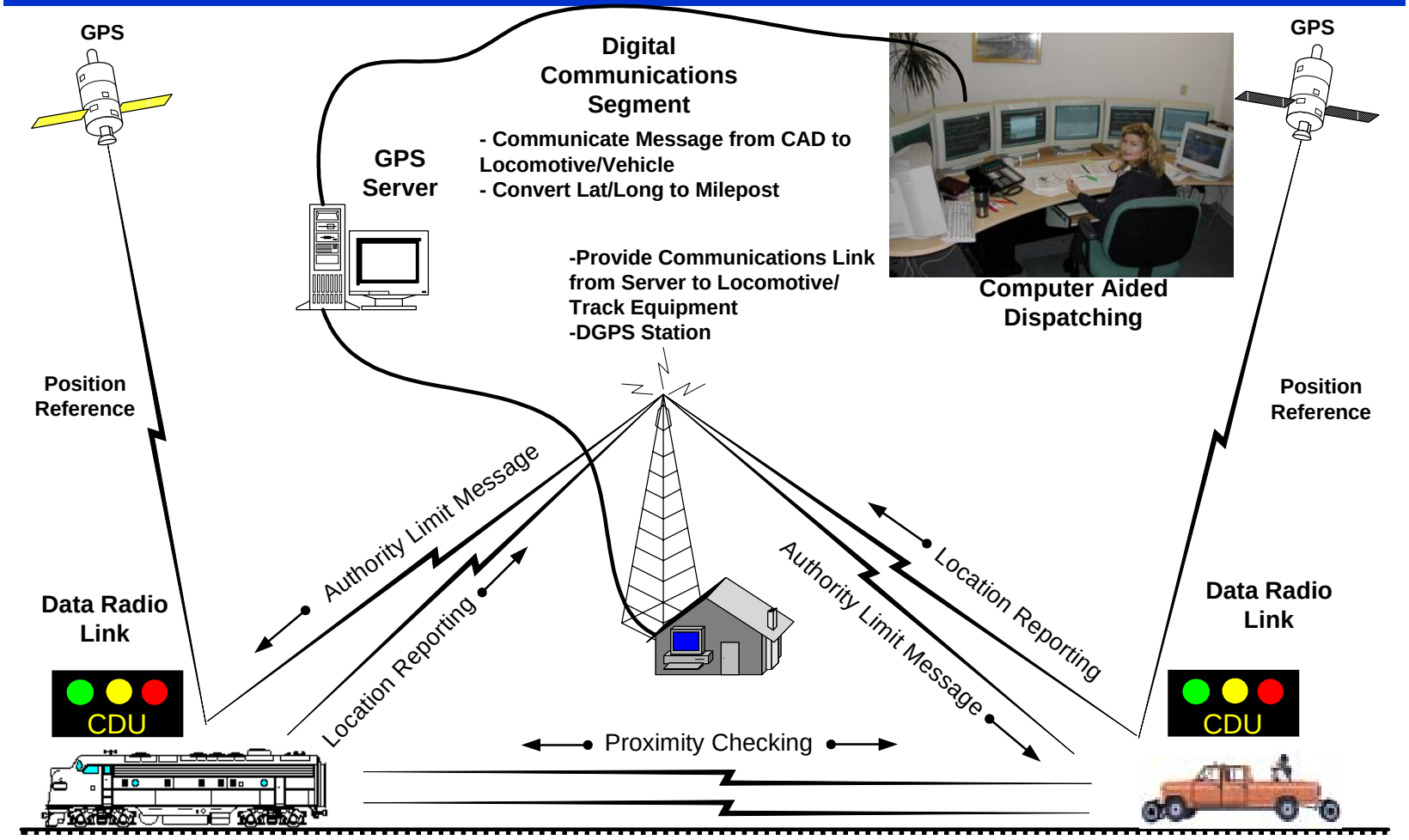


Locomotive Segment

- On Board CAS On-Board Flat Panel Display
- Displays Digitally Transmitted Authorities, Upcoming Manual Switch Position and Block Signal Aspects
- Data Radio/GPS Receiver Unit
- Communicates and Reports Position with Server
- Warns Crew of Proximity of Other CAS Equipped Locomotives and Impending Authority Limits Violations

CAS Part II Step 3

Equip On-Track Vehicles

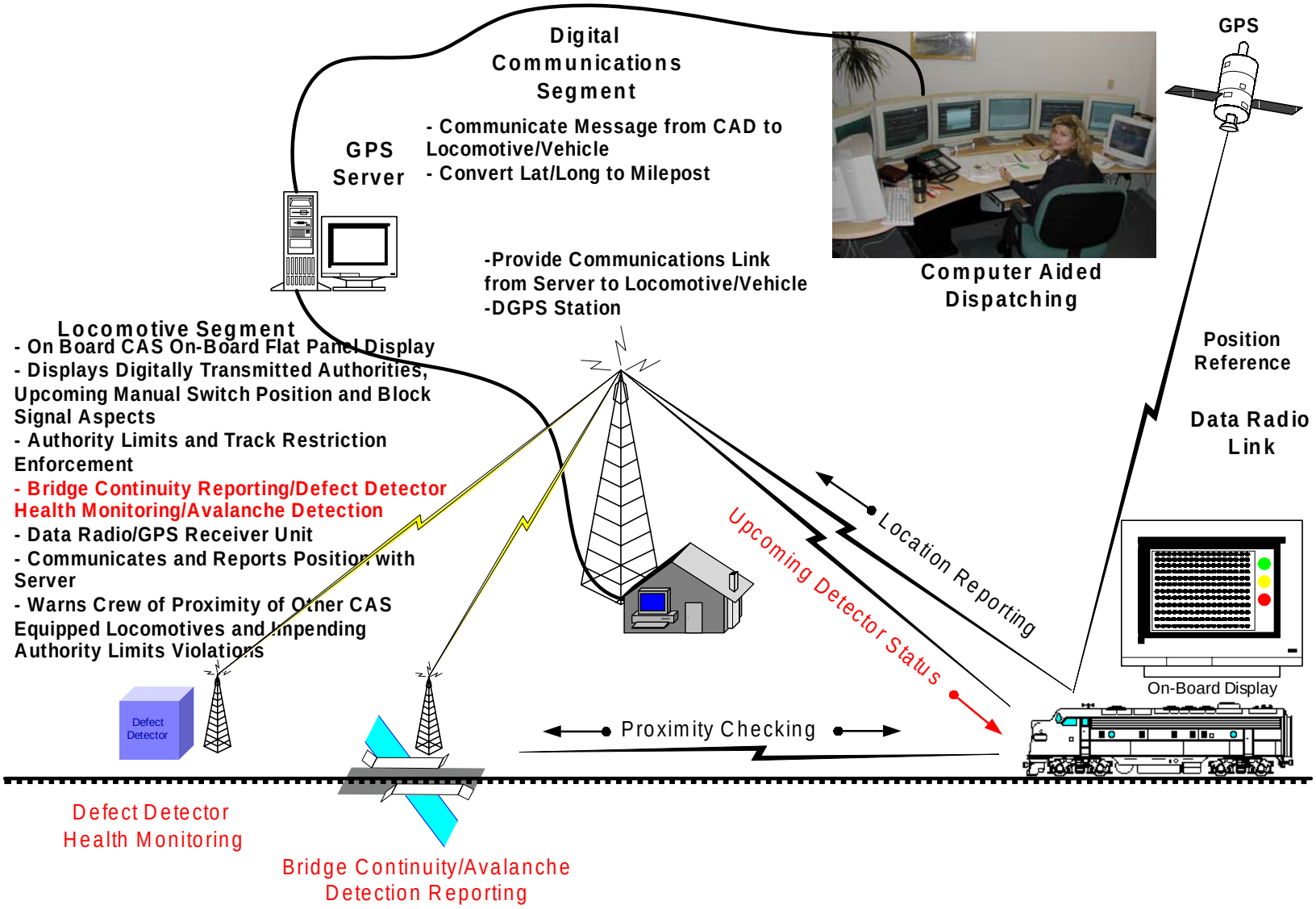


Locomotive/Vehicle Segment

- On Board CAS Display Unit
- Data Radio/GPS Receiver Unit
- Communicates and Reports Position with Server
- Warns Crew of Proximity of Other CAS Equipped Locomotives/Vehicles and Impending Authority Limits Violations

CAS Part II Step 4

Wayside Defect Detection and Disturbed Track Message Distribution



Project Economics
Collision Avoidance System

- SAFETY OVERLAY
- *** Collision Prevention**
- *** Speed Control**
- *** Protection of Roadway workers and on track equipment**
- *** Assure switch alignment**
- *** Provide a more reliable communications infrastructure**

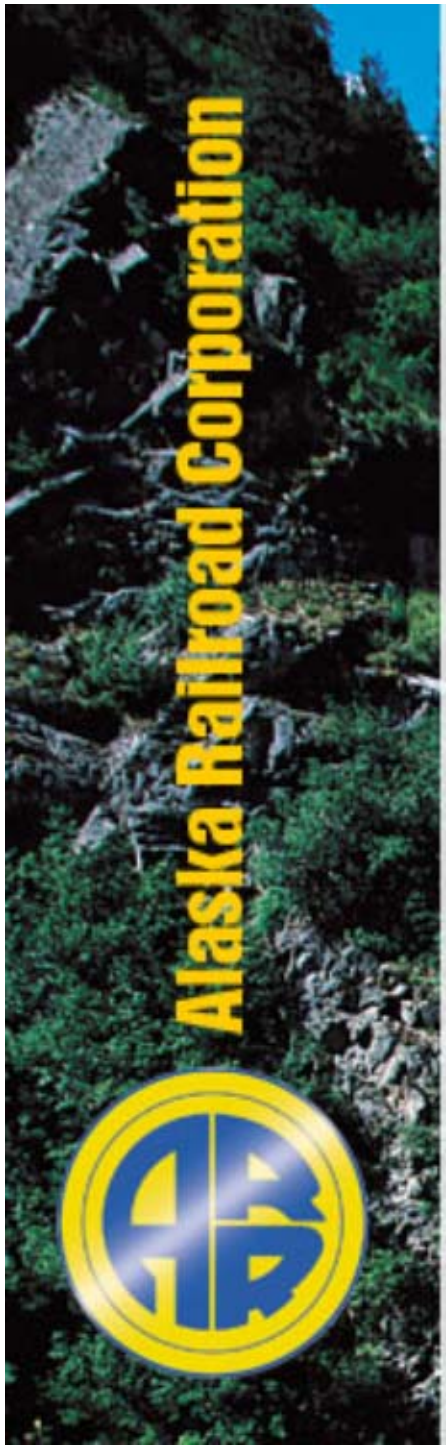
- Improved Equipment Utilization to Reduce Capital Expenditures

- Potentially Eliminate the Need for New Sidings for meets

- Provide upgrade path to control electric switches to support train capacity increases

- Provide manual switch information that is not available today

Sources:
U.S. Department of Transportation, FRA. *Railroad Communications and Train Control*. Report to Congress, July 1994.
Railroad Accident Report -- *Head-on Collision and Derailment of BN Freight Train with UP Freight* NTSB PB94-916302
Railroad Accident Report -- *Collision and Derailment Involving 3 BN Freight Trains new Thedford, NE* NTSB PB93-916303



Working Together

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Requests for Proposals

Number:	00-74-26370 (54K)
Name:	Portable Fall Protection
Date Open:	12/14/00
Date Closed:	04/20/01 3:00pm AST

Number:	01-03-26615 (105K)
Name:	Passenger Train Potable Watering Stations
Date Open:	01/24/01
Date Closed:	02/14/01 3:00pm AST

Number:	01-14-26642 (112K)
Name:	Seward Passenger Dock Engineering Services

http://www.alaskarailroad.com

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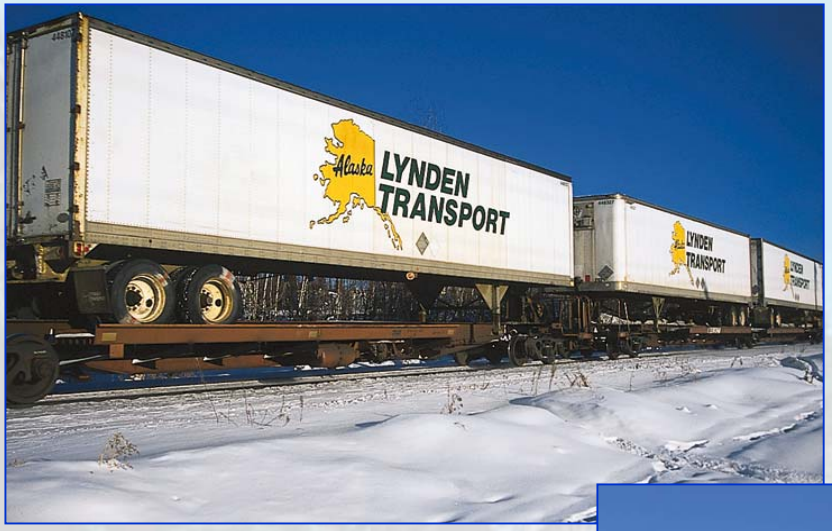

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